DOCUMENT RESUME

ED 327 211 IR 053 393

TITLE	The Information Society--A Challenge for Education Policies?
INSTITUTION	Council of Europe, Strasbourg (France).
REPORT NO	MED-16-3
PUB DATE	89
NOTE	8p.; Paper presented at a Session of the Standing Conference of European Ministers of Education (16th, Istanbul, Turkey, October 11-12, 1989). For related papers, see IR 053 389-392.
PUB TYPE	Viewpoints (120) -- Speeches/Conference Papers (150) --
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Access to Education; *Computer Literacy; Computer Software; Curriculum Enrichment; *Distance Education; Educational Strategies; *Educational Technology; Elementary Secondary Education; Equal Education; Foreign Countries; Global Approach; Higher Education; Information Technology; *Mass Media; Teacher Education
IDENTIFIERS	Information Society; Media Education; *New Information and Communication Technologies

ABSTRACT

This paper looks at some of the characteristics of the information society, assesses its implications for government policies on education, and highlights certain challenges and opportunities for education. Four questions are raised and discussed: (1) whether the role and general goals of education should be adapted to meet the challenge of the emerging information society; (2) what order of priority should be assigned to the New Information and Communication Technologies (NICT) and media-related curricular objectives; (3) how to incorporate these objectives in the curriculum, and (4) how the NICT and the media may best serve the goals of open and distance learning. The conclusion of this paper discusses more practical aspects of integrating the NICT into a curriculum with a special emphasis on software development, teacher training, evaluation, and school management training. (MAB)

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ED327211

Sixteenth Session

Istanbul, 11-12 October 1989

THE INFORMATION SOCIETY - A CHALLENGE FOR EDUCATION POLICIES?

D I S C U S S I O N P A P E R

prepared by the

Committee of Senior Officials

IR053393

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1. INTRODUCTION

1.1 Following the wish expressed by European Ministers of Education at the 15th Session of their Standing Conference (Helsinki, May 1987) that the 16th Session should deal with education, new technologies and the mass media, the Committee of Senior Officials has defined the precise theme as "The information society - a challenge for education policies?"

1.2. This paper looks at some of the characteristics of the information society, assesses its implications for government policies on education, and highlights certain issues for debate. It is based on the preparatory discussions in the Committee of Senior Officials and the various reports written for the Conference.

2. THE CONTEXT

2.1. Economists and sociologists have identified information as the essential feature of production, consumption, and exchange in the "post-industrial" era. This rapidly developing "information society" is marked by the following general characteristics:

2.1.1 exponential growth in the quantity of information, whether in written, sound or image form. It has been estimated that scientific and technological information will double in volume in the next five and a half years;

2.1.2 the increasingly rapid, intensive, and extensive exchange of this information thanks to the development, in various combinations, of the new information and communication technologies (NICT). These include those which extend the capacities of the traditional media (eg television via cable and satellite), those which enable individuals to obtain access at any time to the information and services they want, often interactively (video recorders, videodisks, data banks, videotex, etc), and those based on electronic data processing (computers);

2.1.3 the employment of an increasing proportion of the workforce in creating, processing and transmitting information;

2.1.4 the heavy dependence of the world's economies on NICT, on information, and particularly knowledge, which may be defined as information which has been assimilated and processed through reasoned judgement.

2.2. The advent of the information society has far-reaching implications for all areas of social, political, economic and cultural life, including education.

3. THE INFORMATION SOCIETY AND GENERAL EDUCATIONAL GOALS

3.1. The information explosion will have important consequences for the content of education. However, it will also make the transmission of encyclopaedic knowledge less and less possible or desirable. In the information society, the emphasis will be on the ability to select information, think critically, solve problems, work in teams, form value judgements, communicate, and constantly re-assess knowledge and skills in the light of changing needs.

Maximising chances of employment will depend on readiness to make several changes of occupation throughout working life. Knowledge and skills relating to the NICT, their applications, possibilities and limitations must be treated on a par with literacy and numeracy as fundamental for all members of society.

3.2. The role of education will not be diminished in the information society. Quite the contrary. The fact, for example, that young people derive an ever-growing proportion of their information and knowledge from sources outside education systems heightens the schools' responsibility for helping to make sense of this "informal curriculum". But the relationship between education and the media, always uneasy, is in need of new definition. The media could doubtless play a more prominent educational role without being perceived as a threat by educationists and parents. A new, constructive partnership should be sought.

3.3. In preparing for the information age, education is presented with many challenges and opportunities. Policies to promote greater social justice and equality of opportunity could be jeopardised if the least privileged members of society are inadequately equipped for a world that depends increasingly on intensive communication by means of the new technologies, as they are now too often left behind in the literacy and numeracy stakes. The knowledge gap must not be allowed to widen. This consideration applies to every category of the population liable to suffer from social or cultural disadvantage - whether based on poverty, physical disability, national or ethnic background, age, gender or geography. On the other hand, with suitable policies, the NICT could greatly help to bridge such gaps and to build educational equality and solidarity.

3.4. Furthermore, equality of access to knowledge and skills relating to the information society, its communication networks and its technologies is essential to democracy. Those without such knowledge will be denied influence over the future development of a society increasingly affected by technology.

3.5. There is a need to counteract the tendency for control to be exercised by information providers over information receivers. Information is, indeed, power, and those who control it can dominate, not to say manipulate, the information society. The challenge for education will be, more than ever, to overcome passive acceptance of information in favour of the active exercise of independent judgement.

3.6. A further challenge for education will be to develop the potential of the NICT for enhancing learning about the worldwide physical and cultural environment while, at the same time, fostering the appreciation, understanding and preservation of cultural diversity in a spirit of respect and toleration. The problem is how to benefit from membership of the "global village" created by world communications, without bringing about either the standardisation of cultural values or more intensive confrontation and conflict.

3.7. As regards the general goal of raising the quality of education, the NICT hold great promise for improving the effectiveness of the teaching, and especially the learning, process. But this improvement is unlikely to materialise without far-sighted, co-ordinated policies and strategies relating to the curriculum, hardware, software, teacher training, the organisation and the financing of education.

Question for discussion

(i) **How should the role and the general goals of education be adapted to meet the challenge of the emerging information society?**

4. NICT AND THE MEDIA AT THE SERVICE OF TEACHING AND LEARNING

4.1. Although care should be taken not to claim too much for them, the NICT and the media can considerably enrich the study of most subjects and help in the acquisition of basic and more advanced skills (from reading, writing and arithmetic to information processing, problem solving and logical thinking). The NICT and the media can provide selective access to new kinds of information far beyond the confines of the school and allow its presentation in more vivid and memorable ways (electronic communications, data-bases, videodisk technology, simulation etc). They can provide tools which allow learners to engage in constructive activities such as word processing, design, theory testing or programming the control of machinery. The teaching-learning process could, thus, move further towards the more interactive learner-centred approach leading to intellectual autonomy that has been the ideal of educationists for some time.

4.2. Individualised learning made possible by the NICT should make it easier to teach pupils of widely differing levels of ability, interests and backgrounds in the same classroom, and may be of special help in teaching and motivating slow learners. New technology also represents a particular hope for the education and training of the disabled insofar as it can give them access to the regular curriculum. Its use in compensating for motor or sensory disabilities (eg. Braille transcription) needs no demonstration.

4.3. Particular mention should be made of the potential of NICT to bring schools together all over the world through electronic links and hence to bring a world dimension into the classroom through personal contact. At European level, a network of computerised links should be established.

4.4. The curriculum must also take account of the NICT and the media as subjects of study in their own right. Thus pupils should be brought to understand the social, political, economic and moral implications of the inventions that are shaping society, should be familiar with their applications, strengths and limitations, and should be taught to handle the technologies involved, providing the basis for later specialisation if necessary.

4.5. Media education should play an empowering and liberating role. Thus pupils should be given an understanding of the structures, mechanisms and messages of the mass media. In particular, pupils should develop the independent capacity to apply critical judgement to media content. One means to this end, and an objective in its own right, should be to encourage creative expression and the construction of pupils' own media messages, so that they are equipped to take advantage of opportunities for the expression of particular interests in the context of participation at local level. The fostering of critical independence is, in this sense, closely linked with the development of more active and pupil-centred teaching methods.

4.6. Use of the NICT and the media and the development of knowledge and skills relating to them appear to be of benefit at all levels and in all types of education. In primary schools, despite certain reservations about their use, computers and audio-visual media may be of particular benefit in developing creative communication and language skills. Given the early age at which exposure to the media begins, and the extent of their influence, media education should probably begin as early as possible and continue throughout compulsory schooling. The parents' role in media education should not be overlooked.

4.7. This raises the issue of how the NICT and the media should be incorporated into the secondary curriculum: across the board in all subjects; by insertion of a new compulsory subject or subjects, eg. "computer literacy/studies" or "media education"; or through the addition of optional

courses. These are not, of course, incompatible options, but the cost implications may make it necessary to choose which policy to adopt. The first, across the board option would seem the most appropriate goal because it allows best advantage to be taken of the possibilities offered by NICT and the media, although it will obviously be the most expensive. It would probably be combined with the third possibility - for which it cannot be considered a substitute - addition of optional courses to allow for greater specialisation where necessary.

4.8. As for vocational education, study of a particular occupational field will obviously have to take account of the applications of NICT in that field, and will doubtless build usefully on knowledge and skills acquired in previous general education. However, employers appear to value independent judgement, adaptability and general information-handling, communication, decision-making and problem-solving skills more than detailed proficiency in the use of specific techniques. Thus one problem for vocational education is how to strengthen its general content while, at the same time, incorporating NICT and the media into the curriculum. A further problem is to ensure that both equipment and teachers are kept up to date.

4.9. Particular mention should be made here of the vast potential of the NICT and the media in the development of open and distance education for adults, since they allow considerable flexibility as to what, where, when and at what speed learning takes place. The most important new dimension of this form of education is its growing interactivity through such technological innovations as tele-conferencing. Major functions could be up-dating vocational knowledge and skills for the rapidly changing job market, ensuring a "second chance" or alternative route to those lacking in qualifications, and personal cultural enrichment. Moreover, open and distance learning supported by NICT offers new possibilities for the education of migrant workers in their mother tongue, thereby enabling them to strengthen their cultural and national identity.

4.10. Open and distance learning systems are being established or planned in many parts of Europe. Major efforts to facilitate such initiatives include the Delta and Comett programmes of the European Community and the Olympus satellite launched by the European Space Agency in July 1989. Strong European co-operation is necessary in this field in order to minimise growing costs, share experience and establish a truly European open education based on national activities and accessible to all European citizens. The work already carried out by the Council of Europe on mutual recognition of degrees and diplomas provides a solid basis for this development.

Questions for discussion

(ii) What order of priority should be assigned to NICT and media-related curricular objectives?
(iii) How should these objectives be incorporated into the curriculum?
(iv) How can the NICT and the media best serve the goals of open and distance learning?

5. SOFTWARE, TEACHER TRAINING, EVALUATION AND RELATED ISSUES

5.1. More in response to social and economic pressure than on the ground of proven educational value, a major effort has been made in the last decade to equip schools with NICT, especially computers. It has been said that the effectiveness of this investment has been lessened to the extent that, in promoting the goal of equity, hardware has been spread too thinly, and because

insufficient attention has been paid to the development of adequate software and to teacher training. Experience has shown the need for an "integrated" policy on the three fronts, and for a "critical mass" to be reached in all of them before policy objectives can be met successfully. Further constraints may be problems of compatibility, organisation, management and copyright. In any case, there is a need to evaluate the results of these policies, and to face the question of policy options for the future.

5.2. The lack of high quality, sophisticated educational computer software has been widely recognised, especially software incorporating expert systems with a diagnostic capability. There is also a shortage of audio-visual material for use in educational broadcasting. Both these areas would benefit from subsidisation and the strengthening and development of European information exchange. Every effort should be made to ensure that European public service broadcasters are encouraged to produce a higher proportion of educational programmes and programmes for young people. European satellite channels should be specifically earmarked for educational use, on the lines of the Olympus programme.

5.3. A related problem is that of the use of copyright material for educational purposes. A distinction should be made here between the problem of making educational material such as computer software available at reasonable cost to education systems, for which solutions have been pioneered, as in France, and the copying of broadcast television or radio programme material for use in connection with media education, for example. Teachers are often unable to do this for fear of legal action. Existing copyright legislation appears to be unclear or too restrictive in this regard. Efforts should be made to ensure that teachers can legally use the full range of broadcast material for educational purposes. These problems might be studied in the context of the Council of Europe's existing Recommendations (No R (88) 1 on sound and audiovisual private copying and No R (88) 2 on measures to combat piracy in the field of copyright and neighbouring rights) and on-going work on copyright matters.

5.4. By far the most pressing issue arising in connection with the educational use of NICT and the media is that of teacher training, including school management training. Schools may be saturated with the most sophisticated equipment but unless teachers are able and willing to use it, the whole operation will obviously be a waste of time, effort and money. If NICT and the media are to be incorporated into all subjects in the curriculum, then all teachers need to be trained in their use - at both initial and in-service levels. Teachers obviously need to acquire the knowledge and skills expected of their pupils and the requisite pedagogical skills. There is the question of attitude - hostility born of incomprehension or the perception of threat in the case of new technologies, more outright rejection of a "polluting" influence in the case of the media. With the NICT and the media, the role of the teacher will change from that of information and knowledge transmitter to that of classroom manager and co-ordinator, able to apply a flexible range of teaching strategies appropriate to individual needs. Teacher training in this area should be closely tied to practice in the classroom. The shortage of teacher trainers with appropriate experience is especially acute, and their training should be a priority. The training of head-teachers is also urgent, given the crucial importance of their attitude in determining the success or failure of innovation. Their training should take account of the application of NICT to school management.

5.5. A further set of questions centres on investment, research and evaluation. Heavy investment is being made in pursuit of NICT and media-related goals. Yet, on the whole, very little is known about the effects of this spending, especially in meaningful cost-benefit terms. What has been accomplished? What has been successful? The results of policies should be constantly researched and evaluated, particularly with a view to determining future policy options. It may be increasingly hard to justify continued high-level expenditure if effectiveness remains in doubt and priorities unclear. Likewise, scientific research is needed on the effects of the NICT and the media in education, young people's media tastes, learning materials, etc.

Questions for discussion

(v) **What steps should be taken to increase the supply of educational materials such as software and media programmes?**

(vi) **What steps should be taken to prepare schools and teachers to fulfil the goals prioritised earlier?**

(vii) **Where should future research and development priorities lie?**

6. TECHNOLOGY AND KNOW-HOW TRANSFER

6.1. Productivity and economic growth in an internationally competitive environment will depend very much on NICT-related investment and expertise. To reduce the social and economic imbalances between European countries, the products and experience of the countries which have gone furthest in such development should benefit the others without diverting them from their own aims and purposes or threatening their cultural identity. In this regard, co-operation on the transfer of educational technology and expertise through the appropriate intergovernmental organisations should be strengthened.

Question for discussion

(viii) **What steps should be taken to promote technology and know-how transfer?**